SECTION 8.2 CRITERIA, STANDARDS, AND FACTORS UTILIZED TO DEVELOP TRANSMISSION ROUTE
(WAC 463-42-625)

8.2.1 CRITERIA FOR SITING PIPELINE CORRIDOR

The purpose of the proposed action is to provide a cost-effective, efficient, environmentally sound means to transport refined petroleum products from western Washington refineries to central and eastern Washington to meet the long range needs for product transportation.

There are no federal, state, or industry criteria to be used in route selection for a petroleum product pipeline, but there are accepted practices within the pipeline industry. Olympic Pipe Line Company (OPL) considered many variables when making a final decision on the proposed pipeline route, but five basic criteria were used to conduct the initial investigation; these were pipeline hydraulics, constructability, environmental impacts, ownership/land use, and pipeline access. Each of these criteria is discussed below.

In some cases, two or more criteria may be complementary in that by satisfying one, another may also be satisfied. In other cases, one criterion may actually conflict with another. In selecting a preferred route, an attempt is made to maximize those criteria which are complementary and minimize those which conflict.

In order to compare the cost-effectiveness, efficiency and environmental soundness of alternative routes, the following six criteria were used in evaluating route alternatives:

- Length of pipeline as a cost factor for both construction and operation;
- Elevation profile;
- Constructability;
- Pipeline access;
- Environmental impacts; and
- Ownership/Land Use.

Pipeline Length

The cost of construction and operation of a pipeline is dependent upon its length. Increasing the length of a pipeline route directly increases the amount of materials and labor that must be utilized. There may also be a need to add more pump stations or to increase the diameter of the pipe in order to compensate for the additional frictional losses. Each of these items adds to the pipeline's construction cost. If the size of the pipe is not enlarged, the increase length will result in the consumption of larger amounts of electric energy as the result of additional frictional losses. This adds to the pipeline's operation costs. The estimated effects of these elements are as follows:

- The estimated construction cost for a mile of pipeline is approximately $460,000.
- The estimated construction cost of each pump station is approximately $2 million.
- Enlarging the pipeline by one standard diameter costs approximately $32,000 per mile.
- Increasing the length while holding the diameter constant costs approximately $36,000 per mile-year.

Engineering Criteria

In order to transport the required volumes to eastern Washington, OPL would connect into the existing pipelines that receive petroleum from the refineries in Whatcom and Skagit Counties. A 16" pipeline extends south from the refineries in Whatcom County and is joined by a 16" pipeline that extends easterly from the refineries near Anacortes in Skagit County. These two pipelines come together (Allen Station) west of Burlington, Washington, near the intersection of Allen Road and State Route 20. From this point to Renton, Washington (Renton Station), a 16" and 20" pipeline parallel each other. At Renton, the pipelines come together to form a single 14" pipeline that extends to Portland, Oregon. A pipeline to eastern Washington would tie into the two parallel lines at a point between the Allen Station and the Renton Station.

In addition to volume, there also needs to be enough pressure in the existing pipeline to move the product into the new Cross Cascade Pipeline. This could be accomplished by tying in the new pipeline near an existing pump station or constructing a new pump station. Existing pump stations for the 16" and 20" pipelines are the Allen Station, Woodinville Station, and the Renton Station.

An origin and a destination is considered first when examining a potential route. The origin and destination may be large regions or as small as a specific pipeline station or tie-in point. For the Cross Cascade Pipeline, the origin started out as one of a number of locations along the existing pipeline systems where a connection to both the 16" and 20" could be made, as described above. After several years of evaluation, based on hydraulics the best origin was determined to be just north of OPL’s Woodinville Station. Based on market needs, Northwest Terminalling's Pasco Terminal was chosen as the most appropriate destination. Section 9.1 Analysis of Alternatives describes the alternative routes that were considered between the origin and destination.

Elevation Profile

The cost of construction and operation is also dependent upon the elevation profile of the route. Increasing the total elevation gain of a route or increasing the number of elevation gains and losses both result in an increase in the length of a pipeline's route and often causes an increase in the number of pump stations that are required. This increases the construction cost. High points and sudden elevation losses near the end of pipeline segments create the need to maintain higher than normal back pressures. This results in the consumption of larger amounts of electric energy and higher operating costs.

Pipeline Hydraulics

Pumping any fluid through a pipeline requires energy. The amount of energy required increases with the distance the fluid must be pumped and the higher the elevation gain. The laws of physics which govern pipeline hydraulics provide incentive for OPL to choose a right-of-way which is the shortest distance between two points, and at the same time minimizes changes in elevation along the route. OPL chose paths as straight and level as possible, subject to the other constraints.

Constructability

Constructability refers to the engineering difficulty and construction costs relative to the topography and geology (soils) of a route. Steep and rugged terrain is obviously more difficult to work with when engineering a pipeline, and costs of construction are significantly higher than constructing on more level terrain. However, the shortest and most level distance between two points may not be a feasible route if it provides significant obstacles to construction. Large rock outcroppings, narrow right-of-way, water bodies, and steep slopes are just a few construction obstacles that can add significant costs and even present impassable barriers or difficult barriers.

Areas that need special construction techniques are also a consideration. Such areas include extensive construction through rock, water crossings, including irrigation systems, agricultural fields that have drainage systems, narrow rights-of-way, and steep slopes.

Routes were analyzed using the following criteria:

- Does the route include steep and rugged terrain that would present an impassable or difficult barrier to construction equipment and personnel?
- Does the route include large rock outcroppings that would be a barrier to construction?
- Does the route include narrow right-of-way that would not provide adequate space for construction equipment and materials?
- Does the route cross major water bodies that would require specialized construction techniques?

Pipeline Access

Petroleum pipelines are designed to be in use for decades. Prime consideration is therefore given to pipeline access for maintenance activities when choosing right-of way. The pipeline corridor is chosen so that access to the line is very easy at valve and pump station locations and easy at all other points.
Route locations were reviewed using the following:

- Do existing public roadways exist near the pipeline corridor?
- In an emergency situation, could emergency response personnel reach the pipeline from a public roadway within one hour?
- Do existing public roadways exist near the valve and pump station locations?
- Can access be gained to the sites from the nearest public roadways?

Environmental Impacts

Alternative routes were reviewed on a preliminary basis for significant environmental impacts. The route selected should, to the greatest extent possible, avoid significant environmental impacts. Consideration is given to wetlands, stream crossings, sensitive plant and animal species, and important habitats. Although many of the environmental resource impacts cannot be avoided, the overall impact can be minimized. Selecting a route that includes a high percentage of existing right-of-way can also minimize the overall significance of the impact to the environment. To minimize the disturbance of existing habitats and land uses, routes that would use existing cleared or disturbed rights-of-way are preferred.

Criteria include:

- How many miles of existing cleared or disturbed rights-of-way would the alternative route use?
- How many miles of new right-of-way would have to be cleared?
- How many major water crossings would be crossed by each alternative route?
- Does the alternative route cross any known highly sensitive plant and animal habitats?

The first planning principle was to utilize areas that have been impacted previously and to avoid areas that have not been impacted previously. Previously impacted areas include:

- Rights-of-way for roads, rail-trails, electric power transmission lines, and other pipelines which are appropriate and otherwise compatible with the proposed pipeline.
- Parcels on which the plant communities and other features of the landscape have been significantly altered by logging, grazing, or cultivation

The second planning principle was to avoid sensitive/critical areas to the maximum feasible extent. These areas include:

- Old growth forest;
- Priority plant and animal habitat;
- Sub-alpine and alpine habitat;
- Lakes;
- Streams;
- Wetlands;
- Highly erodible/unstable slopes; and
- Historically/culturally significant sites.

Avoidance of impacts to these features occurs primarily by physically avoiding contact with the feature and any associated buffers.

The third planning principle was to minimize impacts to sensitive/critical areas when avoidance of those areas was not possible. Large wetlands or streams that extend across the width of the route are examples of aquatic features that are in this category.

- Where wetlands or streams could not be avoided, an alignment was selected that routed the pipeline through the narrowest and/or least sensitive portion of the feature.

Further impact reduction will be accomplished during construction by:

- Narrowing the width of the construction corridor;
- Minimizing riparian tree removal;
- Having construction equipment work from beyond the boundary of the feature where feasible and from equipment mats elsewhere;
- Using erosion/sediment control devices; and
- Undertaking rapid stabilization and revegetation of disturbed areas.

In reviewing proposed water crossings, two questions were asked of each crossing location and proposed method:

- Are there practicable alternative locations for the pipeline alignment that would result in less impact to the aquatic ecosystem?
- Are there practicable alternative construction techniques that could be utilized at a given crossing location that would result in less impact to the aquatic ecosystem?

In general, since streams are long linear features, it is not possible for a pipeline alignment to avoid crossing them. The following criteria define the issues of concern with respect to stream crossings:

- Is there a nearby practicable location for the stream crossing that would result in deceased impacts to the streambed or riparian zone?
- Is there a nearby practicable location for the stream crossing that would result in decreased potential for erosion, sedimentation, or water quality degradation?
- Is there a nearby practicable location for the stream crossing that would enable a construction method to be used with fewer environmental impacts?

In contrast, wetlands tend to occupy a defined space with identifiable boundaries. It is theoretically possible for a pipeline to entirely avoid wetlands and the regulations require that to be done unless it can be demonstrated that it is not practicable to do so. The following criteria define the issues of concern with respect to wetland crossings:

- Can the pipeline alignment be moved slightly (i.e., into an upland) to avoid the special aquatic site?
- If an upland alignment is available, has it been previously impacted?
- If an upland alignment is available, will its use result in the loss of any priority habitat or other sensitive habitat?
- If an upland alignment is available, will its use result in indirect impacts to special aquatic sites such as loss of buffers, destabilization of adjacent banks/slopes, modification of hydrology, or degradation of water quality?
- If an upland alignment is available, will its use bring the pipeline alignment into proximity with structures used for residential, industrial, or public assembly purposes?
- If an upland alignment is available, will its use result in the alignment being unacceptably close to other structures such as the base of electric transmission towers/poles, buried power or communication cables, or other buried utility lines such as those used to transport water, sewer, natural gas, and crude/refined petroleum?
- If an upland alignment is available, will its use result in the alignment being in an area that is subject to disturbance by others performing routine construction/maintenance activities on roads or other utility facilities?
- If an upland alignment is available, will its use result in the alignment being in an area that is likely to necessitate a relocation of the pipeline in the future?
- Is there a nearby location that would result in less total impact on special aquatic sites, taking into account size, plant community, and functions?

Ownership/Land Use

The overall cost and time to acquire rights-of-way for a proposed pipeline is a significant consideration.

Constructing a pipeline through highly developed areas is expensive and there are often significant landowner issues that have to be considered. Although these areas often cannot be avoided, construction through highly developed areas can be minimized by careful selection of a route. Minimizing the total number of land owners that are affected reduces the number of easements that have to be negotiated and the overall cost of the project. Selecting a route that traverses grazing and/or unproductive land, the utilization of existing corridors, and large tracts of land that are under single ownership is a factor in evaluating potential routes.

- Does the proposed route cross through populated areas?
- Does the proposed route cross through land in which the use of a pipeline would conflict with adjacent existing land uses?
- Would the proposed route cause the long-term loss of agricultural land?

8.2.2 CRITERIA FOR SITING PUMP STATIONS

Within the preferred corridor between Thrashers Corner and Pasco, alternative locations for pump stations were also considered. The criteria used for evaluating alternative pump station locations are:

- Adequate land area for pump station
- Adequate existing electrical power supply, or proximity of existing electrical supply
- Appropriate hydraulic location
- Year-round access to site

8.2.3 CRITERIA FOR SITING TERMINAL

The criteria used for evaluating alternative sites for the Kittitas Terminal are:

- Site must be located near the middle of central Washington to serve as an efficient distribution point for central Washington.
- Site must be located in close proximity to major east-west and north-south highways to provide efficient distribution to central Washington.
- In order to avoid maintaining excessive amounts of back pressure on the pipeline, the site needs to be located in an area of gradual elevation change and far enough east or west of areas such as Elk Height where there is a rapid elevation gain.
- Adequate site size.
- Availability of electric power at the site.
- Compatible land uses adjacent to the site and along connecting corridors between the site and major highways.
- Availability of existing adequate transportation infrastructure from major highways to the site for tanker truck traffic.

- Ability to purchase site for the facility and to secure proper zoning.

8.2.4 CRITERIA FOR EVALUATING ALTERNATIVE CENTERLINE LOCATIONS

The criteria used for evaluating alternative centerline locations include:

- Preference for use of existing cleared rights-of-way, including transmission line corridors, trails, and roadways.
- Avoidance of high quality wetlands or wildlife habitat.
- Minimizing impacts at stream crossings by the use of existing bridges.
- Minimizing impacts at stream or river crossings by using the narrowest feasible crossing points.
- Avoidance of land use impacts, such as existing structures, irrigated crop lands, gardens, orchards, and golf course fairways.
- Land owner preferences as to line location.

8.2.5 ROUTE SELECTION

The proposed route meets the above criteria to the greatest extent possible. Although there may have been alternative routes which would have satisfied any one of the criteria to a greater extent than the selected route, each would have had created greater conflicts with other criteria.

The application of the above stated planning principles for route selection leads to avoidance of most small to medium size isolated wetlands. The effectiveness of the using these principles for the Cross Cascade Pipeline is demonstrated by the fact that only 17.07 acres out of approximately 1000 acres of wetlands lying within 200' of the pipeline alignment are directly impacted by the project. Avoidance is particularly important with respect to high-quality wetlands (e.g., Category I wetlands) and wetland types which are difficult to replicate (e.g., forested wetlands).

As a result of applying the avoidance principle, only 0.54 acres of forested wetlands are directly impacted along the 231-mile Cross Cascade Pipeline route. Furthermore, no estuaries, alpine wetlands, or bogs are impacted by the project. Additional details on wetland avoidance and impacts can be found in the wetland technical report for the Cross Cascade Pipeline project.

Avoidance is also important for the streams with the most valuable fish habitat. As a result of applying the avoidance principle, out of 293 waterway crossings only 23 were rated as having a high fish habitat value. Additional details on the habitat value of the steams along the route can be found in the fisheries and aquatic resources technical report for the Cross Cascade Pipeline project.

See Section 9.1 Analysis of Alternatives for a discussion on the alternative routes.

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